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Angioplasty of the Proximal Left Anterior Descending Coronary Artery: Initial Success and Long-Term Follow-Up

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From 1984 to 1987, 537 consecutive patients (mean age 58 years; range 34 to 79) underwent angioplasty for proximal left anterior descending coronary artery disease. The procedure was clinically successful in 516 (96.1%). Procedural complications included myocardial infarction (2.2%; Q wave 0.9%, non-Q wave 1.3%), in-hospital bypass surgery (3%) and death (0.4%). Follow-up was obtained in 534 patients (99.8%) for a mean duration of 44 months (range 8 to 75).

Follow-up cardiac catheterization, performed in 391 patients (76%), demonstrated a 39.6% angiographic restenosis rate. Ninety-eight (19%) of the patients with a clinically successful result required additional revascularization for recurrent left anterior descending artery disease by angioplasty (12.8%) or coronary artery bypass grafting (4.7%), or both (1.5%). During follow-up there was a 2.5% incidence rate of myocardial infarction (anterior myocardial infarction 1.6%), and 27 patients (5.2%) died, 14 (2.7%) of cardiac causes.

The actuarial 5-year cardiac survival rate was 97%, freedom from cardiac death and myocardial infarction was 94% and freedom from cardiac death, myocardial infarction, coronary artery bypass surgery and repeat left anterior descending artery angioplasty was 77%. At last follow-up 76% of patients were free of angina and 86% reported sustained functional improvement.

Angioplasty is an effective treatment for proximal left anterior descending coronary artery disease that has a high success rate, low incidence of procedural complications and provides excellent long-term cardiac survival, freedom from cardiac events and sustained functional improvement.

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Treatment of patients with severe single-vessel proximal left anterior descending coronary artery stenosis has remained controversial because no surgical revascularization strategy has conclusively demonstrated improved survival or less risk of myocardial infarction than is achieved with medical therapy (1–3). Natural history studies of proximal left anterior descending disease, which have shown increased but variable rates of death and infarction (4–13), suffer from selection bias because they exclude patients who present with infarction or sudden death (14–17). In addition, event-free survival rates in these studies are usually based on data that include varying crossover to coronary artery bypass grafting for patients with uncontrolled symptoms.

However, the recent advent of percutaneous transluminal coronary angioplasty, and particularly the development of improved steerable balloon catheter technology and the increased number of experienced angioplasty operators, has renewed the controversy about performing revascularization for proximal left anterior descending coronary artery disease. In addition, the increasing use of an internal mammary artery graft in this setting with excellent long-term patency, combined with low mortality and operative myocardial infarction rates, has made surgical revascularization an effective therapy (18–23). A randomized trial comparing angioplasty and bypass grafting for proximal left anterior descending artery disease is impractical because of the large number of patients and high costs required to assess hard end points (13,24). Finally, the results of a nonmatched patient series in which heterogeneous patient groups undergo angioplasty or bypass surgery based on physician and patient preference are not conclusive (24).

The long-term results of isolated proximal left anterior descending artery angioplasty reflecting more recent balloon catheter technology and operator experience are not well defined. We therefore examined the immediate and long-term results of all eligible patients who underwent single-vessel elective angioplasty of the proximal left anterior descending artery at The Cleveland Clinic Foundation during the 4-year period 1984 to 1987.

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Table 1. Clinical and Angiographic Characteristics of 537 Patients With Angioplasty of the Proximal Left Anterior Descending Coronary Artery

Age	
Mean ± SD (yr)	58.1 ± 10.0
Range (yr)	34 to 79
≥70 yr	13.8%
Men	70.1%
Hypertension	36.8%
Diabetes	11.2%
Hyperlipidemia	20.3%
Continued smoking	62.2%
Angina functional class*	
Class 1 to 2	48.5%
Class 3 to 4	51.5%
Unstable angina	31.5%
Previous myocardial infarction	24.6%
Q wave anterior	11.5%
Non-Q wave anterior	3.5%
Extent of coronary disease	
1 Vessel	76.8%
2 Vessel	18.9%
3 Vessel	4.3%
Anatomic location of lesion	
Ostial	59.8%
Non-ostial	40.2%
Left ventricular function	
Normal	71.3%
Mild dysfunction	20.8%
Moderate/severe dysfunction	7.9%

*New York Heart Association criteria.

Methods

Selection of patients. The Coronary Angioplasty Registry at the Cleveland Clinic was reviewed to identify those patients who underwent elective angioplasty of the proximal left anterior descending artery between January 1, 1984 and December 31, 1987. The proximal left anterior descending artery was defined as extending from the vessel origin to the takeoff of the anatomic first septal perforator and first diagonal branches. Ostial lesions were considered those located proximal to the origin of any branches. Exclusion criteria included the following: 1) prior angioplasty or open heart surgery; 2) severe valvular disease; 3) planned multivessel or multilesion angioplasty, including any nonproximal left anterior descending artery angioplasty within 3 months of the initial procedure; and 4) angioplasty for total left anterior descending artery occlusion. A total of 537 patients who met these criteria after a complete chart review constituted the study group.

Clinical characteristics (Table 1). The average age of the 537 patients was 58 years (range 34 to 79) and 70% were male. A history of prior myocardial infarction was noted in 25% of patients, single-vessel coronary disease was present in 77% and left ventricular function was normal or mildly impaired in 92%. The New York Heart Association angina class before angioplasty was class III or IV in 52% of patients; 32% of patients were classified as having unstable angina.

Definitions. *Extent of coronary artery disease* was defined as the number of epicardial vessels (or major branches) with ≥50% stenosis. Angiographic success was defined as <50% residual stenosis after angioplasty with ≥20% reduction in original stenosis. Clinical success was defined as angiographic success not associated with a major in-hospital complication (death, myocardial infarction, bypass surgery). Restenosis was defined as lumen narrowing ≥50% at the dilated site. The degree of stenosis was assessed by caliper measurement in the view that best demonstrated the maximal severity of the lesion. Digital calipers were used and the standard magnification of a Tagarno projector was utilized.

Left ventricular dysfunction was assessed by contrast ventriculography and categorized as mild, moderate or severe on the basis of an ejection fraction of 46% to 55%, 31% to 45% or <30%, respectively.

Unstable angina was defined as 1) angina of recent onset in the presence of an accelerating pattern, 2) progressive angina on effort, and 3) angina at rest.

Q wave myocardial infarction was defined as the presence of new significant Q waves in at least two leads and non-Q wave infarction by electrocardiographic (ECG) changes with elevation of the creatine kinase MB fraction to >30 U/liter after angioplasty or bypass surgery, or both.

Acute closure in the catheterization laboratory was defined as complete occlusion of the dilated vessel associated with Thrombolysis in Myocardial Infarction (TIMI) grade 0 or 1 flow.

Acute in-hospital closure syndrome was defined as evidence of ischemia after the patient had left the catheterization laboratory, usually associated with total occlusion or severe compromise of the dilated vessel that required surgical revascularization or repeat angioplasty.

Emergency bypass surgery was defined as in-hospital bypass surgery performed because of an unstable angioplasty result or evidence of acute ischemia even in the absence of symptoms. Elective bypass grafting was defined as in-hospital bypass surgery performed after unsuccessful angioplasty in the absence of either an unstable angioplasty result or ischemia.

Angioplasty technique. The angioplasty procedure was performed by experienced operators following a standard protocol. Medications given before angioplasty consisted of a calcium channel blocking agent and antiplatelet agents (aspirin with or without dipyridamole). During the procedure, intravenous heparin and intracoronary or intravenous nitroglycerin, or both, were used. After angioplasty, patients continued to receive nitrates for ≥24 h, a calcium channel blocker for ≥6 months and antiplatelet therapy indefinitely.

Long-term follow-up. Patients were followed up by return clinic visits, direct phone contact and mail questionnaires. All reported follow-up events were confirmed by chart review or by contact with the referring physician or hospital, or both. The standard follow-up questionnaire,

Table 2. In-Hospital Success and Complications of Angioplasty of the Proximal Left Anterior Descending Artery in 537 Patients

Angiographic success	523 (97.4%)
Clinical success	516 (96.1%)
In-hospital bypass surgery	16 (3.0%)
Myocardial infarction	12 (2.2%)
Q wave	5 (0.9%)
Non-Q wave	7 (1.3%)
Acute occlusion syndrome	19 (3.5%)
In-laboratory occlusion	10 (1.8%)
In-hospital occlusion	9 (1.7%)
Death	2 (0.4%)
% Lumen narrowing (mean ± SD)	
Before angioplasty	80.2 ± 11.3
After angioplasty	16.8 ± 15.0

completed every 2 years, asks the patient or patient's family, or both, to record any interval cardiac events—catheterization, myocardial infarction, repeat angioplasty, bypass surgery or death. Two questions about functional status are included: 1) Does the patient currently have chest discomfort? 2) Is the patient's functional capacity improved, the same or worse since the initial angioplasty? Verification of the cause of death was determined by review of the autopsy report or death certificate, or both.

Statistics. Univariate analyses comparing baseline characteristics between groups were performed by using the *t* test for continuous variables and chi-square test for categoric factors. Estimates for survival and event-free survival were calculated with the Kaplan-Meier method and differences between curves were tested with a log-rank statistic. Multivariate analyses using a Cox proportional hazards model adjusted for differences in initial patient group characteristics and tested whether different patient groups were significantly related to long-term event-free survival.

Results

In-hospital success and complications (Table 2). Angiographic success was achieved in 523 patients (97.4%) and clinical success in 516 patients (96.1%). The clinical success rate was higher in men (96.8%) than in women (94.4%), but the difference was not statistically significant ($p = 0.18$). Similarly, there was no significant difference between the clinical success rates for ostial and nonostial lesions (95.6% and 96.8%, respectively; $p = 0.51$).

Surgical coronary bypass grafting was performed before hospital discharge in 16 patients (3%); the operation was an emergency procedure in 14 patients (2.6%) and elective in 2 (0.4%). The procedure was performed because of left main trunk dissection in five patients, left anterior descending artery dissection in five (including three who developed acute occlusion in the laboratory), acute in-hospital vessel closure in four and unsuccessful dilation in two.

Myocardial infarction occurred in 12 patients (2.2%); 5 (0.9%) had a Q wave and 7 (1.3%) a non-Q wave infarction. Seven (44%) of the 16 patients who underwent in-hospital bypass surgery had angioplasty complicated by a myocardial infarction: 4 (25%) had a Q wave and 3 (19%) a non-Q wave infarction.

Two deaths occurred after surgical bypass grafting performed after initial angioplasty. One patient with an acute in-hospital occlusion syndrome died of cardiogenic shock within 24 h. The other patient, a high risk surgical candidate with unstable angina whose angioplasty was complicated by a left main trunk dissection, required three Gore-Tex bypass grafts because of the absence of suitable venous conduits. In this patient there were multiple medical complications and in-hospital death occurred after 3 months.

Acute occlusion in the catheterization laboratory occurred in 10 patients (1.9%). All arteries but one were successfully reopened. Three of the 10 patients required emergency bypass surgery, and 2 of these sustained a Q wave myocardial infarction. Of the other seven patients who did not require bypass surgery, three sustained a myocardial infarction (Q wave in one, non-Q wave in two).

Acute in-hospital occlusion syndrome occurred in nine patients (1.7%) within 24 h of angioplasty. Reopening of the artery was attempted in eight patients and was successful in seven. Two of the patients with successful reopening required urgent bypass surgery because of a continued hazy appearance of the vessel in one and concern for possible reclosure in the other. Emergency surgery was also performed for the one patient in whom reopening was not successful, as well as for one patient in whom recatheterization was not attempted in the presence of cardiogenic shock and difficult vascular access. The latter patient died postoperatively. Overall, five of the nine patients developed nonfatal myocardial infarction (Q wave in two, non-Q wave in three). Only two (22%) of the nine patients with acute in-hospital occlusion had ultimate clinical success. No procedure was complicated by a stroke.

Follow-up (Table 3). Long-term follow-up was obtained in 534 patients (99.8%). The mean follow-up duration was 44 months (range 8 to 75). Of the 516 patients with a clinically successful result, 98 (19%) required additional revascularization by angioplasty or bypass surgery for recurrent proximal left anterior descending disease. A second angioplasty procedure for recurrent left anterior descending artery stenosis was performed in 74 patients (14.3%) with a clinical success rate of 97.3%. Emergency bypass surgery was required in one patient who sustained a non-Q wave myocardial infarction. There was one additional non-Q wave infarction for an overall myocardial infarction rate of 2.7%. Twenty-eight patients (5.2%) had a second angioplasty procedure at a different site. A third procedure was performed in nine patients including six (1.2%) who required it for recurrent proximal left anterior descending artery disease. The procedure was successful in five of the six patients with a second restenosis. A total of 33 patients (6.4%) underwent bypass surgery including 8 (1.5%) with restenosis after a second left

Table 3. Follow-Up Data: Follow-Up Period (excluding death): 43.7 ± 16.8 Months (range 8.3 to 75)

	Patients	
	With Clinically Successful Angioplasty (n = 516)	Total Group (intention to treat)* (n = 537)
All deaths	27 (5.2%)	29 (5.4%)
Cardiac death	14 (2.7%)	16 (3.0%)
Bypass surgery	33 (6.4%)	49 (9.1%)
Myocardial infarction: all	13 (2.5%)	25 (4.6%)
Anterior	8 (1.6%)	20 (3.7%)
Anterior Q wave	4 (0.8%)	9 (1.7%)
Second angioplasty: all	102 (19.8%)	103 (19.2%)
For recurrent proximal LAD disease	74 (14.3%)	75 (14.0%)
With clinical success	72 (97.3%)	72 (96.0%)
Third angioplasty: all	9 (1.7%)	9 (1.7%)
For recurrent proximal LAD disease	6 (1.2%)	6 (1.1%)
With clinical success	5	5
Symptomatic status of 508 surviving patients		
Improved	447 (88%)	
Asymptomatic	385 (76%)	

*In-hospital events included. LAD = left anterior descending coronary artery.

anterior descending artery angioplasty procedure and 1 patient who had a widely patent vessel.

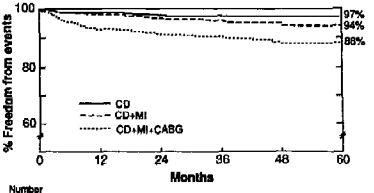
Thirteen patients (2.5%) sustained a myocardial infarction during follow-up including four with a Q wave anterior and four with a non-Q wave anterior infarction and five with a Q wave inferior, lateral or posterior infarction.

Death occurred in 27 patients (5.2%), including 14 (2.7%) with a cardiac death. The group with a cardiac death included two patients with chronic heart failure before angioplasty who died of end-stage heart failure without an intervening myocardial infarction. The 13 noncardiac deaths were due to malignancy in 8 patients, renal failure in 2, diabetic complications in 1 patient, pneumonia in 1 and stroke in 1.

Actuarial 5-year freedom from cardiac death for the total study group was 97%; freedom from cardiac death and myocardial infarction was 94% and freedom from cardiac death, myocardial infarction and bypass surgery was 88% (Fig. 1). The 5-year event-free survival rate including angioplasty of recurrent proximal left anterior descending disease in this group was 77% and 71% if all angioplasty procedures were included (Fig. 2).

At the time of last follow-up, 76% of patients were free of angina. In addition, 88% of patients reported sustained functional improvement.

Angiographic follow-up. Until 1986 it was institutional policy to pursue angiographic follow-up on all angioplasty patients at about 6 months after the procedure. Consequently, angiography was performed in 391 (76%) of the patients with clinically successful angioplasty at a mean interval of 12 ± 13.5 months (median 6.5) after angioplasty.



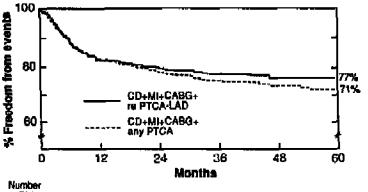
Number at Risk					
CD	512	430	348	234	72
CD+MI	507	424	342	227	71
CD+MI+CABG	491	398	319	209	66

Figure 1. Five-year Kaplan-Meier actuarial freedom from cardiac death (CD), myocardial infarction (MI) and coronary bypass surgery (CABG) in 537 consecutive patients undergoing elective percutaneous transluminal angioplasty of the proximal left anterior descending coronary artery.

The angiographic restenosis rate was 39.6%. Fifty-seven of the 155 patients with angiographic restenosis were treated medically. There were no cardiac deaths or myocardial infarctions among these 57 patients during follow-up. There was no statistically significant difference in cardiac survival ($p = 0.26$) or myocardial infarction-free cardiac survival ($p = 0.12$) between this subset of patients and the entire study group. In addition, at last follow-up, 81.4% of patients were asymptomatic and 86% reported sustained functional improvement.

Subgroup analysis. Table 4 demonstrates actuarial 5-year cardiac event-free survival with regard to gender, age >70 or <70 years, left ventricular function, anatomic location of the lesions and extent of coronary artery disease.

Figure 2. Five-year Kaplan-Meier actuarial freedom from cardiac death (CD), myocardial infarction (MI), coronary bypass surgery (CABG) and repeat proximal left anterior descending (LAD) percutaneous transluminal angioplasty (re PTCA) or any angioplasty in 537 consecutive patients undergoing elective percutaneous transluminal angioplasty of the proximal left anterior descending coronary artery.



Number at Risk					
CD+MI+CABG+ re PTCA-LAD	431	348	275	180	63
CD+MI+CABG+ any PTCA	426	342	282	174	62

Table 4. Subgroup Analysis: Event-Free Survival (%)

	Cardiac Survival		CD + MI		CD + CABG		CD + re-PTCA LAD		CD + MI + CABG + re-PTCA LAD	
Women	95.4	0.09*	92.0	0.15*	90.0	0.49*	83.4	0.66*	76.2	0.85*
Men	97.8		95.8		90.8		83.1		76.3	
Age <70 yr	97.6	0.10*	94.8	0.15*	91.2	0.12*	83.8	0.14*	77.4	0.17*
Age >70 yr	94.4		90.0		86.0		79.3		73.6	
Normal-mild LV dysfunction	97.5	0.06*	94.7	0.16*	91.2	0.07*	84.7	0.006*	78.2	0.03*
Moderate-severe LV dysfunction	92.7		86.9		82.5		64.0		59.0	
Distal disease	97.2	0.85*	94.2	0.85*	91.7	0.35*	83.1	0.78	77.7	0.64*
Nonostial disease	96.9		94.0		88.6		83.2		75.5	
Single-vessel disease	97.7	0.37*	94.8	0.36*	92.3	0.01*	82.9	0.74	77.8	0.39*
Multivessel disease	95.2		92.0		84.2		83.9		73.8	

*p values comparing bracketed data. CABG = coronary bypass surgery; CD = cardiac death; LAD = left anterior descending coronary artery; LV = left ventricular; MI = myocardial infarction; re-PTCA = repeat percutaneous transluminal coronary angioplasty.

Discussion

Procedural outcome. Coronary angioplasty continues to evolve as a nonsurgical revascularization technique, as demonstrated by comparing the National Heart, Lung, and Blood Institute experience of 1977 to 1981 with that of 1985 to 1986 (25). For single-vessel angioplasty the clinical success rate increased from 63.6% to 84.3%, the need for emergency bypass surgery decreased from 6.1% to 2.9% and the in-hospital mortality rate decreased from 1.3% to 0.2% (all $p < 0.05$).

By comparison, in the present study 537 patients underwent elective angioplasty of the proximal left anterior descending coronary artery from 1984 to 1987 with a clinical success rate of 96.1%. Emergency bypass grafting was required in 2.6% and elective in-hospital surgery in 0.4% of patients. Q wave myocardial infarction occurred in 0.9% and non-Q wave infarction in 1.3% of patients. There were two in-hospital deaths (0.4%) and no patient experienced a stroke.

Among the 14 patients who underwent emergency bypass surgery were 2 who died as a result of the angioplasty procedure and 7 who had a myocardial infarction (Q wave in four, three non-Q wave). These data represent a 12.5% mortality rate and a 44% infarction rate for in-hospital bypass surgery. However, these calculations are based on a small number of surgical procedures. In a much larger series from the same institution reported on by Golding et al. (26), 81 patients required urgent bypass grafting after failed angioplasty performed during the period 1981 to 1985. The number of patients with proximal left anterior descending coronary artery disease was not specified. There were also two deaths (2.5%) and the infarction rate was 46%. However, the incidence rate of myocardial infarction was only 10% in those patients whose condition could be stabilized with preoperative resolution of ischemic electrocardiographic changes.

Most studies (including the present study) that have evaluated the results of emergency bypass surgery after coronary angioplasty predate the availability of new devices that may be used to stabilize the condition of patients preoperatively or eliminate the need for surgical intervention. A variety of devices such as perfusion catheters, Stack perfusion balloon, thermal laser, atherectomy catheters and stents have been used to treat acute occlusion in a small number of patients (27–32). These preliminary results have shown a decreased rate of perioperative infarction (27,28), stabilization of coronary dissection that would otherwise require surgery (29–32), resolution of intracoronary thrombus (30) and increased use of an internal mammary artery graft (28). However, use of these devices requires prior guide wire placement, which is not always possible after acute occlusion has occurred.

Long-term results. The 5-year actuarial cardiac survival rate of 97% and freedom from myocardial infarction and cardiac death rate of 94% in the present series demonstrate an excellent long-term prognosis for patients undergoing angioplasty of the proximal left anterior descending coronary artery. However, the study group was composed largely of patients who had single-vessel coronary artery disease (77%) and normal or mildly depressed left ventricular function (92%). For these patients a good long-term survival could have been predicted without any intervention based on several natural history studies of single-vessel coronary artery disease (1,2,5). Nevertheless, for the group of patients with disease at a site before the first septal perforator, the 5-year actuarial cardiac survival rate was 97.2% in the current series and only 90% in the medically treated patients of the Duke Registry (6). Similar findings have been reported by Klein et al. (9) with 93% 3-year survival for medically treated patients with >70% proximal single-vessel left anterior descending coronary disease. Furthermore, the actuarial 5-year cardiac death and myocardial infarction rate of 6% reported in the present series is significantly lower than the rates of 18% to 20% reported in one-vessel coronary artery disease studies (6,13).

There has been considerable discussion (33) regarding the high angiographic restenosis rate of the proximal left anterior descending artery, which is approximately 40% as confirmed

in the present study. Such a rate is based on incomplete angiographic follow-up and reflects the higher probability of restudy in symptomatic patients. Angiographic restenosis has traditionally been used as the standard for defining continued anatomic angioplasty success. However, a clinically relevant measure of long-term success is the number of patients requiring a second revascularization procedure for recurrent disease, which in the present study was 19%. With this acceptable rate of repeat revascularization, including additional angioplasty at a different site in 5.2%, 76% of patients remained asymptomatic at last follow-up and 88% reported sustained functional improvement.

Subgroup analysis. As expected, moderate or severe left ventricular dysfunction was associated with a trend for decreased cardiac survival ($p = 0.06$) and was found to be a predictor of repeat left anterior descending artery angioplasty ($p = 0.006$) and cardiac events ($p = 0.03$). Similarly, extent of coronary artery disease was a significant predictor of crossover to bypass surgery ($p = 0.01$). Neither patient gender nor anatomic location of the lesion affected the immediate or long-term outcome.

Comparison with previous studies. Apart from the present study, the other large study of angioplasty for proximal left anterior descending stenosis was reported by Talley et al. (34) in 1981, whose study group included 265 patients. The clinical success rate was 84.5%, the incidence rate of myocardial infarction was 5.7% and in-hospital bypass surgery was required in 8.3% of patients. There were no deaths. At 5-year follow-up, freedom from cardiac death and myocardial infarction for patients with a clinically successful result was 92.8%; 25.9% of patients had repeat angioplasty and 14.7% had surgery during follow-up. The lower success rate and the greater number of in-hospital events of this series reflect the time period of the study.

The results of the present series appear to contrast with those of the study of Kramer et al. (35) in which 413 patients with single-vessel left anterior descending artery disease underwent angioplasty from 1980 to 1984. In the latter study, a nonmatched comparison was made with 368 patients undergoing single-vessel bypass surgery to the left anterior descending artery over the same time period. The inclusion of 14 patients with acute myocardial infarction in the series, 11 of whom underwent angioplasty, confounds the assessment of procedural outcome and complications. As expected with the earlier time period studied, the 90.6% clinical success rate for angioplasty was lower than that of the current series and a greater proportion of patients (7.7%) required in-hospital bypass surgery.

Nevertheless, a careful analysis of the data provided in the study of Kramer et al. (35) reveals that actuarial 5-year cardiac survival and freedom from cardiac death and myocardial infarction during follow-up were similar in the angioplasty and surgical groups. Specifically, the overall cardiac survival rate was 98.5% for surgery and 99% for angioplasty, and the rate of survival without cardiac death or myocardial infarction was 96% and 96.5%, respectively.

The 5-year survival rates without cardiac death or myocardial infarction for the surgical and angioplasty groups in the studies of Kramer et al. (35), Talley et al. (34) and the present series are similar (range 92.8% to 96.5%). For the angioplasty groups these excellent long-term results were achieved with variable patient crossover to bypass surgery (about 23% in the study by Talley et al. [34], 14.5% in that by Kramer et al. [35] and 9.1% in the current series). Regardless of the initial revascularization strategy employed, it appears that the 5-year survival rate without cardiac death or myocardial infarction has an upper limit that borders on 95%. However, the steadily improving angioplasty results and the availability of new interventional devices suggest that these survival rates could be obtained by angioplasty alone in an increasing number of patients.

Conclusions. In the treatment of a severe proximal left anterior descending stenosis, many factors must be considered in deciding whether elective angioplasty or bypass surgery is more appropriate for a given patient with suitable anatomy and clinical indications for revascularization. At an experienced center demonstrating a high rate of procedural success for either angioplasty or bypass surgery, the issue of follow-up procedures and events becomes crucial. Those patients with appropriate single-vessel proximal left anterior descending artery disease may be offered angioplasty with the full understanding that a second revascularization procedure—angioplasty or surgery—will be required for recurrent disease in about 20%. The available data suggest that both angioplasty and bypass surgery can provide excellent long-term results with a low risk of cardiac death and myocardial infarction.

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